

## The genus *Hyale* in Chile

(Crustacea, Amphipoda)

By E. González



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The gammaridean marine amphipods is a group poorly known in Chile, from the point of view of their taxonomy. This has led to their exclusion from the descriptive work done in the Central and Northern intertidal zones of our country. *Hyale* is the more conspicuous genus in the intertidal, especially for the sizes some of the species can reach. There are five species known from Chile, *H. rubra*, *H. maroubrae*, *H. hirtipalma*, *H. media* and *H. grandicornis*, none of them endemic. This work redescribes the known species and illustrates the main characteristics of each one.

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### Introduction

Gammaridean amphipods has been a group poorly studied in Chile. The best known genus is *Hyale* and it is also the most abundant in the rocky intertidal zone of our coast. There are five species known from Chile, living together in most places in the intertidal zone, mainly on algae, some species showing specific level relationships (Lancelloti, personal communication). Gammaridean amphipods play a very important role in the intertidal for the initial fragmentation of organic matter (Robertson & Mann, 1980), they are also associated to the reproduction of some algae (Buschmann & Santelices, 1987).

Although being omnivores, their preferences are macroalgae (Taraman et. al., 1985). Community and population studies in amphipods are abundant for other latitudes (Moore, 1977; Edgar & Moore, 1986; Moore, 1986). There are not much advances in this sense in Chile, mainly due to the lack of taxonomic knowledge of the group. The species of the genus present in Chile have been described long ago. However, the descriptions are not well known and sometimes hard to get. This fact has discouraged the development of taxonomic studies and hence their inclusion in ecological works. I want to present here a short description of each of the species present on our coast, two of them (*H. media* and *H. maroubrae*) are new records for Chile. *H. rubra* extends its range to Coquimbo in the south and to Iquique in the north, it was only recorded before for Antofagasta by Barnard (1979). *H. hirtipalma* and *H. grandicornis* are the most abundant and well known species, although after 1950 they have been not cited for the Chilean coast, with the single exception of the work of Andres (1975). None of the species are endemic for the region, all are present in New Zealand and some on the coast of California. The complex group of species in this genus requires a further detailed study, comparing the different morphology present in the regions where they are found.

## Hyalidae

### *Hyale Rathke*

*Hyale Rathke*, 1837;

*Hyale* Sars, 1895; Stebing, 1906; Hurley, 1957; Barnard, 1969; Barnard, 1979.

*Nicea* Nicolet, 1849.

*Allorchestes* Dana, 1853 & 1855 (in part).

Diagnosis. Palp of Maxilla 1 with one article; antenna 1 longer than peduncle of antenna 2, more evident in males; maxillipedal palp with four articles, fourth unguiform; mandible lacks palp; gnathopods subchelate in both sexes, gnathopod 2 in males larger than gnathopod 1. In females this is not evident; article 5 of gnathopod 2 in males not posteriorly produced between articles 4 and 6; article 5 of gnathopod 2 in females it is posteriorly produced between articles 4 and 6, this is generally confused with the genus *Allorchestes*; uropod 3 lacks inner ramus; telson completely cleft.

### *Hyale rubra* (Thompson)

Figs 1–2

*Nicea rubra* Thompson, 1789: 236, Pl. 10B, Fig. 3.

*Hyale rubra* Barnard, 1979: 101, Fig. 56, hG1o–hP3

Diagnosis. Article 4 of maxillipedal palp with an apical bundle of long setae; gnathopod 2 strong in males, article 6 subovate with oblique palm occupying most of posterior margin, with spines and setae on margin, a strong tooth on proximal end; dactyl same length as palm; article 6 of pereopods with strong serrated spines on posterior margin; peduncle of uropod 1 with a strong spine on the superior distal end; telson cleft; left lacinia mobilis with 5 teeth.

Description of male.

Length 5.8–6.0 mm.

Antenna 1, primary flagellum about twice the peduncle. Antenna 2 with article 5 of peduncle as long as articles 3 and 4; setae in anterior and posterior regions of primary flagellum segments. Mandible with triturative molar, left lacinia mobilis with 5 teeth; incisor with teeth, mandible similar to other species of *Hyale*. Maxilla 1, inner plate slender with two strong setae on end; outer plate with several strong, toothed spines and with setae in the upper part of interior margin; palp reaches beyond distal end of outer plate. Lower lip with strong mandibular processes. Maxilliped with setose inner and outer plates, article 4 of maxillipedal palp with long setae on its distal end. Gnathopod 1 on posterior region of article 5 with a bundle of strong setae, article 6 with straight palm, dactyl reaches to defining tooth on proximal palm end. Gnathopod 2, article 2 with a pronounced anterodistal lobe, article 6 with a setose oblique palm, also with a row of shorter setae, dactyl ends in a small cavity with a strong tooth. In larger specimens (6.0 mm) palm has a short, strong tooth and few setae, palm length is only  $\frac{2}{3}$  of posterior margin of article. Pereopods 3 and 4, article 6 with 3 strong teeth in posterior margin of article. Pereopods, 5, 6 and 7 with strong spines on articles 4, 5 and 6, those of article 6 strongest and serrated in one of their margins, spines mixed with long setae. Uropod 1, peduncle with spines in the margin, three on inner and four on outer margin, also with an interramal spine that reaches to half of inner ramus or uropod. Rami of uropods with dorsal spines, three on inner ramus and one on outer; each ramus with three to four distal spines. Uropod 2, with one spine on the inner margin of peduncle and two on the outer margin; inner ramus with two spines on dorsal margin and four on distal end; outer ramus with a dorsal spine and three on distal end. Uropod 3, peduncle with three distal spines; ramus with six to seven distal spines. Telson completely cleft and with three to five apical spines on dorso-lateral regions of lobes.

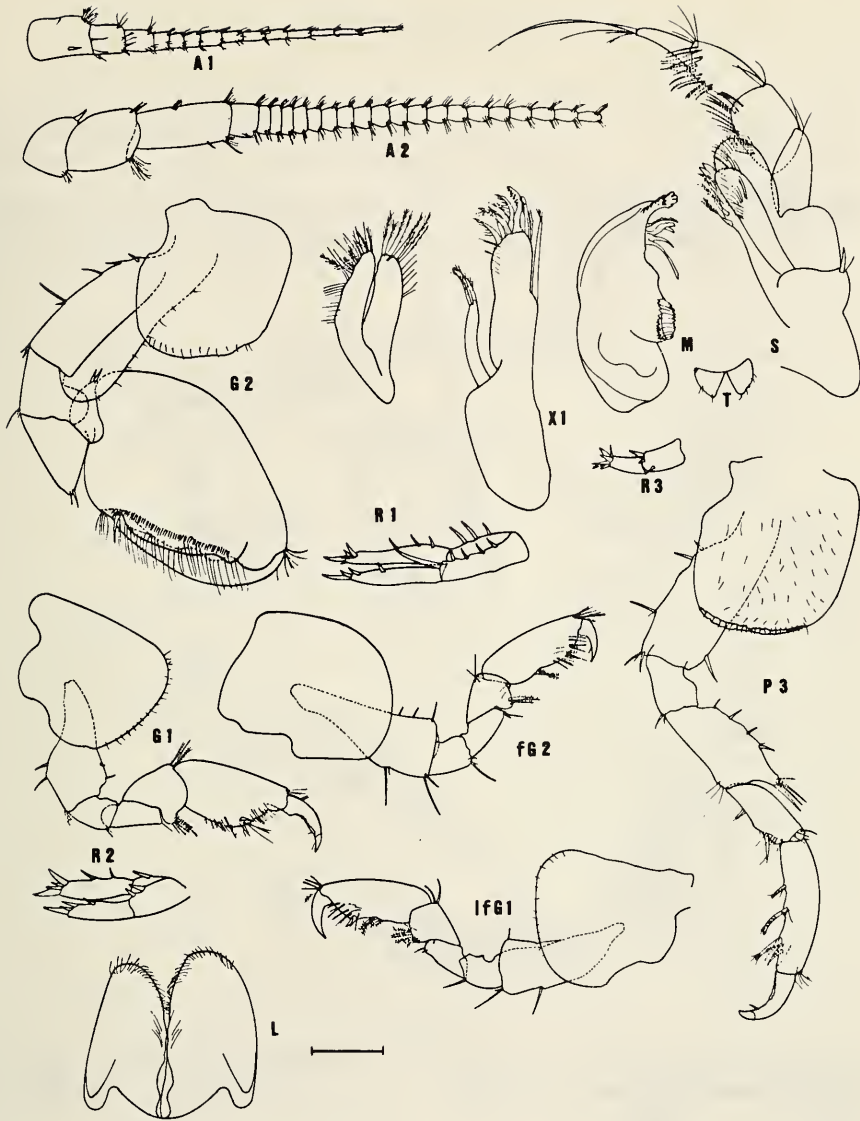


Fig. 1. *Hyale rubra*, male length 6.0 mm. Female "f", length 4.6 mm. X2, X1, M, S, and 1, scale equivalent to 120 microns. A. Antenna; G. Gnathopod; K. spine, seta, or denticle; L. Upper Lip; M. Mandible; P. Pereopod; S. Maxilliped; T. Telson; X. Maxilla; R. Uropod. Lower case letters on the left side of capital letters refer to specimens cited in captions; lower case letters on the right are as follow: 1. left; p. apices; a. rami or outer plate. Scale indicated in the lower right corner, equivalent to 250 microns, except where indicated as different.

Description of female "f"

Length 4.6 mm.

Gnathopod 1, transverse palm with two strong teeth on posterior end, plumose setae on posterior margin of article 6. Gnathopod 2, transverse palm with long spines and setae, two to three plumose setae in posterior margin of article 6.

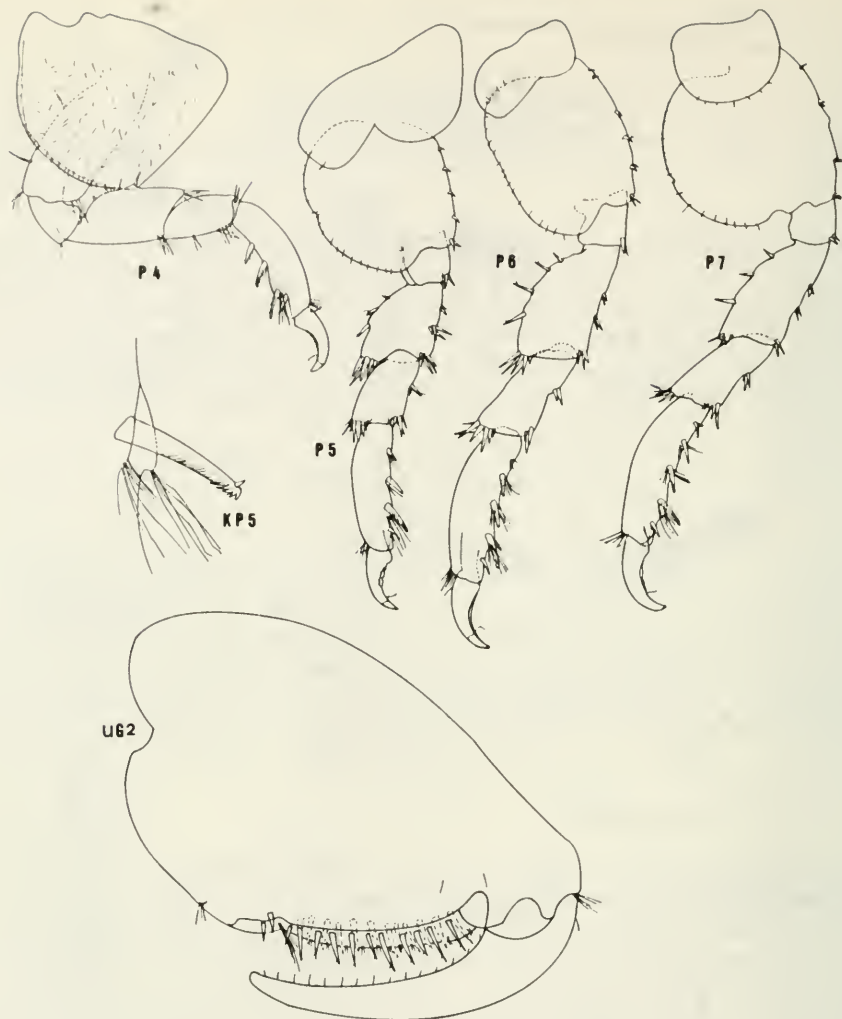


Fig. 2. *Hyale rubra*, male length 6.0 mm, "u" male length 7.0 mm. Symbols as in Fig. 1. KP5. size scale equivalent to 60 microns. uG2 size scale equivalent to 120 microns.

Distribution in Chile. This species, reported only from Antofagasta, has been found also in Iquique and Coquimbo.

Examined material. Intertidal samples from Iquique 20°12'S 70°10'W; Caleta Coloso (Antofagasta) 23°38'S 70°25'W; Bahía Herradura of Guayacán (Coquimbo) 29°58'S 71°22'W; La Pampilla (Coquimbo) 29°56'S 71°21'W.

*Hyale hirtipalma* (Dana)

Figs 3-5

*Allorchestes hirtipalma* Dana, 1852: 205

*Allorchestes hirtipalma* Dana, 1853 & 1855: 888-889, Pl. 60 Fig. 4 a-i.

*Hyale hirtipalma* Hurley, 1957: 922-926, Pl. 7-8, Figs 118-146.

Diagnosis. Gnathopod 2 subchelate in male, article 6 ovate, palm oblique, posterior margin of article 5 densely setose in total length, palm occupying  $\frac{2}{3}$  of posterior margin.

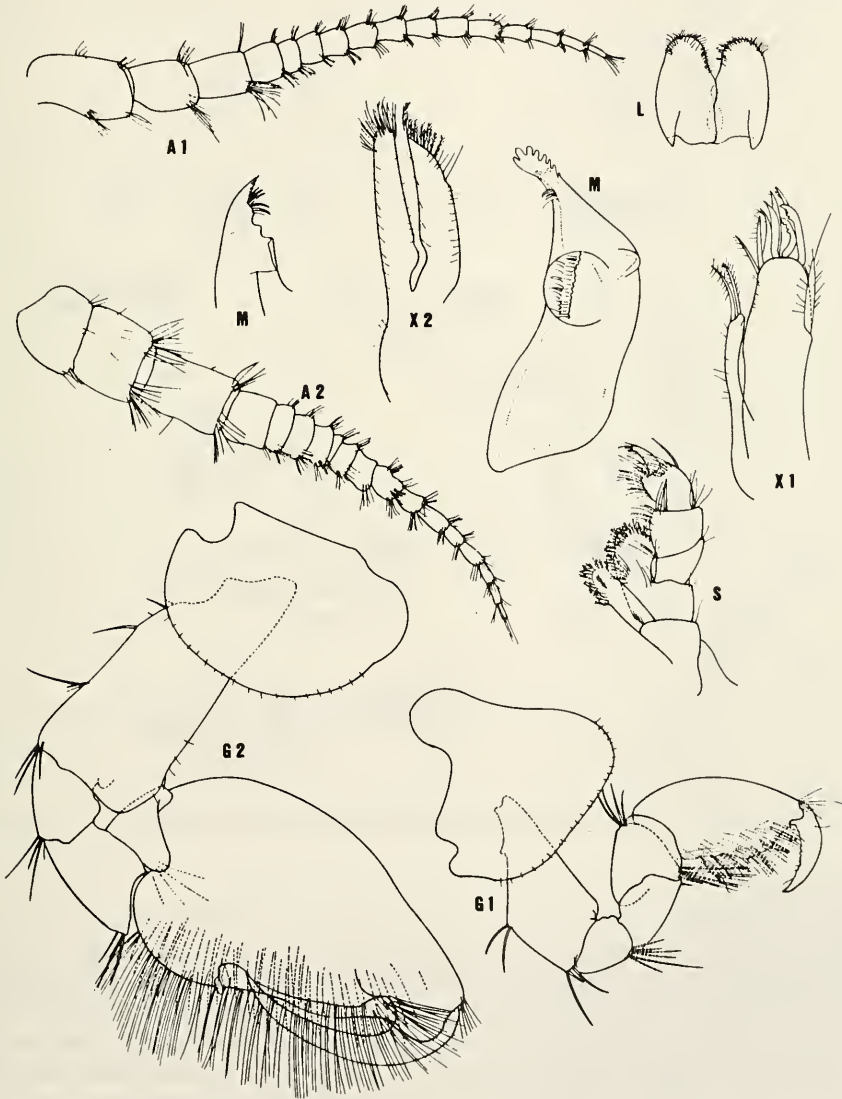


Fig. 3. *Hyale hirtipalma*, male length 8.0 mm. Symbols as in Fig. 1. X2, X1 and M. size scale equivalent to 120 microns.

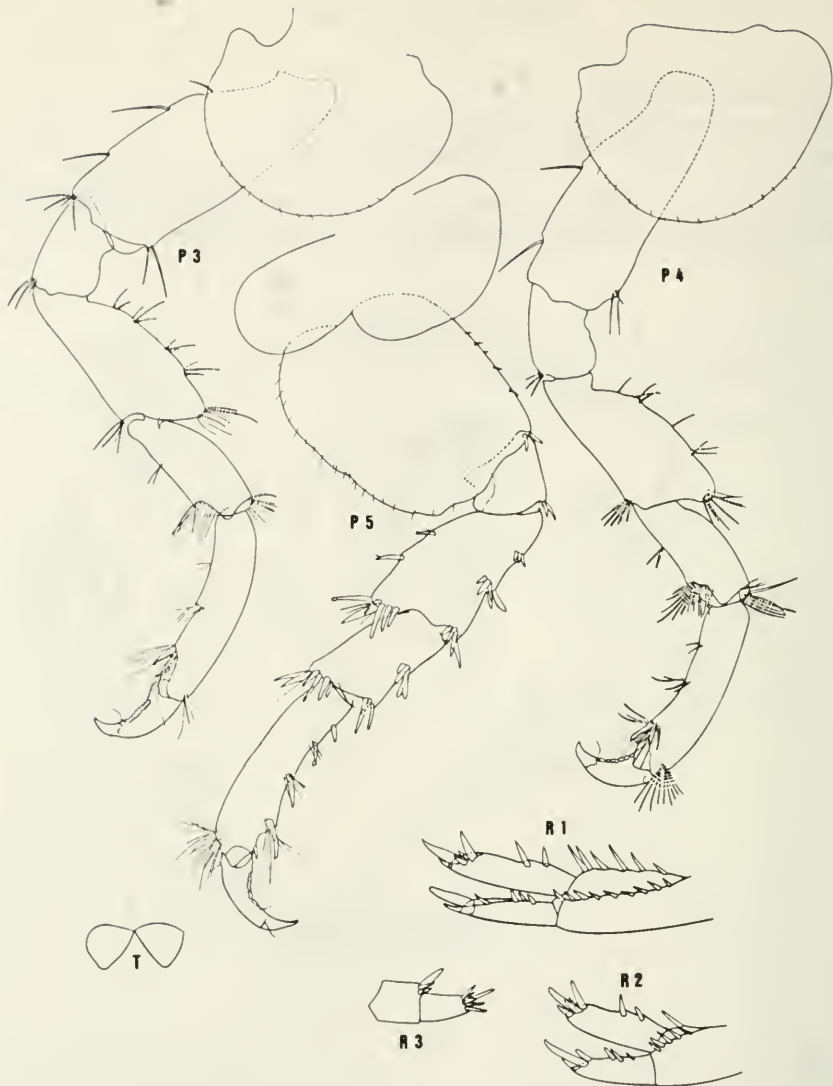


Fig. 4. *Hyale hirtipalma*, male length 8.0 mm. Symbols as in Fig. 1.

#### Description of male

Length 8.0–9.2 mm.

Antenna 1 shorter than antenna 2, it reaches to  $\frac{2}{3}$  of primary flagellum; antenna 1 and 2 densely setose at distal end of articles in peduncle and primary flagellum. Mandible with trituate molar, with a plumose seta on molar. First Maxilla, inner plate with two long plumose setae, palp with a long seta on its distal end. Second Maxilla, with plumose setae at the end of inner and outer plates. Maxilliped, with large inner plate, parallel margins, plumose setae from the distal third of inner margin to distal end; outer plate longer than inner plate, with plumose setae; palp with article 1 and 2 widened, article 3 ovoid, article 4 dactyliform. Gnathopod 1, coxal plate with anterior margin longer than posterior margin; article 2 with two to three long spines on posterior margin and two to three on distal posterior

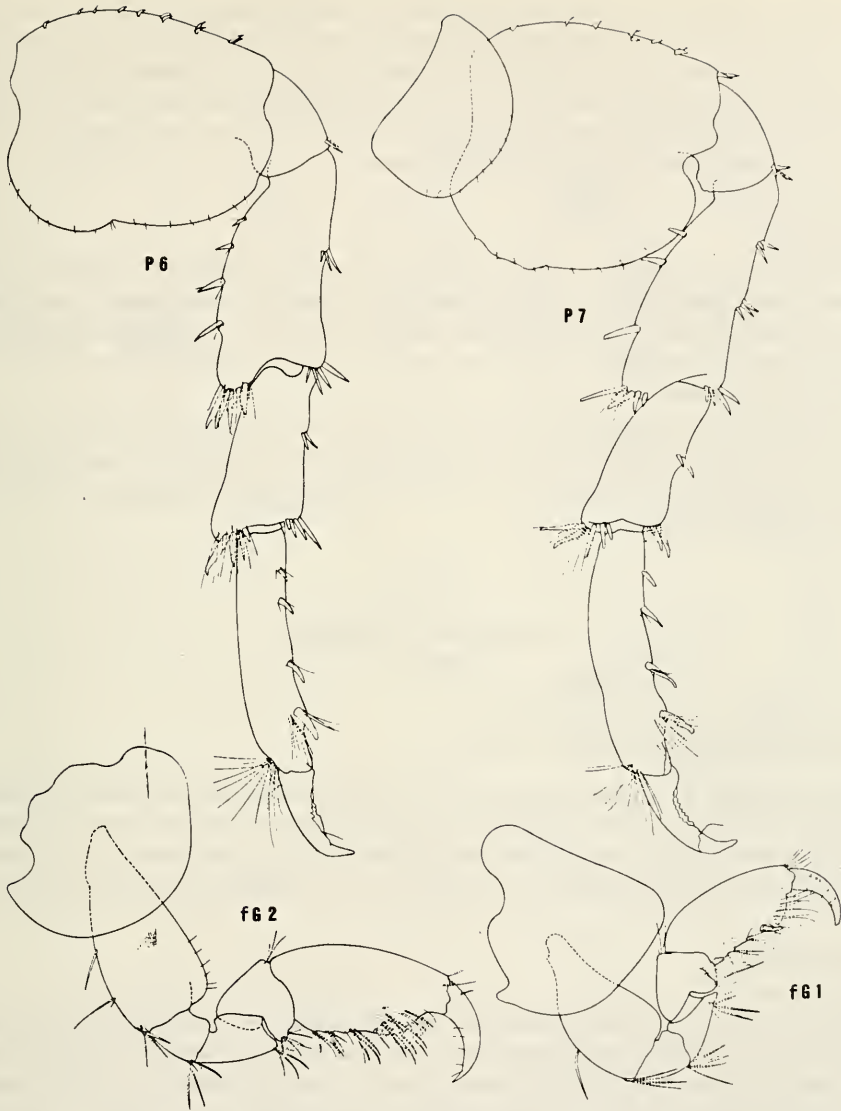


Fig. 5. *Hyale hirtipalma*, male length 8.0 mm. Female "f", length 7.2 mm. Symbols as in Fig. 1.

end; article 3 small, with 6 spines on distal posterior end; article 5 with anterior margin longer than posterior, with a row of long setae at posterior margin that reaches half of next article; article 6 with setose posterior margin, palm oblique and short with three groups of setae on margin; dactyl larger than palm. Gnathopod 2, coxal plate narrow, ventrally rounded; article 2 with small setae on anterior margin, posterior margin with two long setae; article 5 produced anteriorly and between article 4 and 6; article 6 anteriorly widened, ovoidal, posterior margin strongly setose, inner and outer sides of margin with long setae, palm occupies  $\frac{2}{3}$  of posterior margin, its proximal end with a cavity with two stout spines, where closes the distal end of dactyl; dactyl curved and occupying the whole palm. Pereopods 3 and 4 slightly setose, with setae on anterior margin of article 4 and the distal ends of other articles,

one strong spine on distal end of article 6; pereopods 5–7 weakly setose, strong spines on anterior margin of articles 4, 5, 6 and posterior margin of article 4; strong teeth on distal ends of articles. Uropod 1 and 2, peduncle with strong spines on dorsal margin, inner and outer rami with two spines on dorsal margin and five on distal end; outer ramus, three spines on dorsal margin and three on distal end. Uropod 3, uniramous with three spines on distal end of peduncle and six on distal end of ramus. Telson cleft, with triangular lobes, without spines or setae.

Description of female "f".

Length 7.2 mm.

Body of smaller proportions than male, with the same characteristics in almost all appendages, except on gnathopods. Gnathopod 1, coxal plate ovoidal, with pointed apex on upper posterior margin; article 6, with parallel margins and a small palm almost straight, posterior margin with long setae. Gnathopod 2, article 6, straight and short palm, with setae, posterior margin of article with two to three bundles of long setae.

Examined material. Intertidal samples from: Bahía of La Herradura of Guayacán (Coquimbo) 29°58'S 71°22'W; Los Molles 31°14'S 71°33'W; Montemar 32°58'S 71°30'W; Isla Negra 33°25'S 71°43'W; Punta El Lacho 33°31'S 71°43'W; El Tabo 33°31'S 71°43'W; Pelancura 33°32'S 71°43'W; Cobquecura 36°06'S 72°29'W.

### *Hyalé maroubrae* Stebbing

Figs 6–7

*Hyalé maroubrae* Stebbing 1899: 405–406 Pl. 32, E.

*Hyalé maroubrae* Hurley 1957: 913–916, Pl. 4, Figs 51–71.

Diagnosis. Gnathopod 1 in male, article 6 subchelate and quadrate, palm transverse with medial region emarginated, hidden by dactyl, spines under the palm, posterior distal end forms a serrated lobe; gnathopod 2 in male, article 6 ovoidal, palm oblique with spines on whole margin, dactyl occupying the whole palm; pereopods 1–5 with strong serrated spines on article 6, the most distal spine strong and fusiform.

Description of male

Length 4.9 mm.

Antenna 1,  $\frac{2}{3}$  of antenna 2, primary flagellum with nine articles and short bundles of setae on distal ends. Antenna 2 with 16 articles on primary flagellum, short bundles of setae on distal ends, antennae in general weakly setose. Mandibles as in genus. Maxilla 1, palp of outer plate slightly longer than plate, a long spine on distal end; outer plate with strong theethed spines on its margin; inner plate with two long plumose setae. Maxilla 2, inner plate with plumose setae only on distal margin, slender and short setae on interior margin; outer plate with long setae on distal margin and short spines on interior and exterior margin of the plate. Maxilliped, inner plate subrectangular, three teeth on distal margin, row of plumose spines on inner margin, outer plate rounded on its distal end, palp with dactyl as long as article 3, setae on its inner margin, article 3 with short setae. Gnathopod 1, large subrectangular coxa, article 2 with three large spines about  $\frac{2}{3}$  toward proximal end, article 5 with four large spines on antero-distal margin, posterior lobe with setae and long spines; article 6, transverse palm with spines on posterior margin, palm on its posterior end with a serrated lobe. Dactyl short and unguiform, occupying the whole palm. This kind of gnathopod 1 is unique among the species present in Chile. Gnathopod 2, small subquadrate coxa; subovate article 6, oblique palm with strong spines on its posterior margin, dactyl occupying the whole palm, originates near the base of article, one to two strong spines on posterior proximal end of palm. Pereopod 3, strong spines on article 6, three on



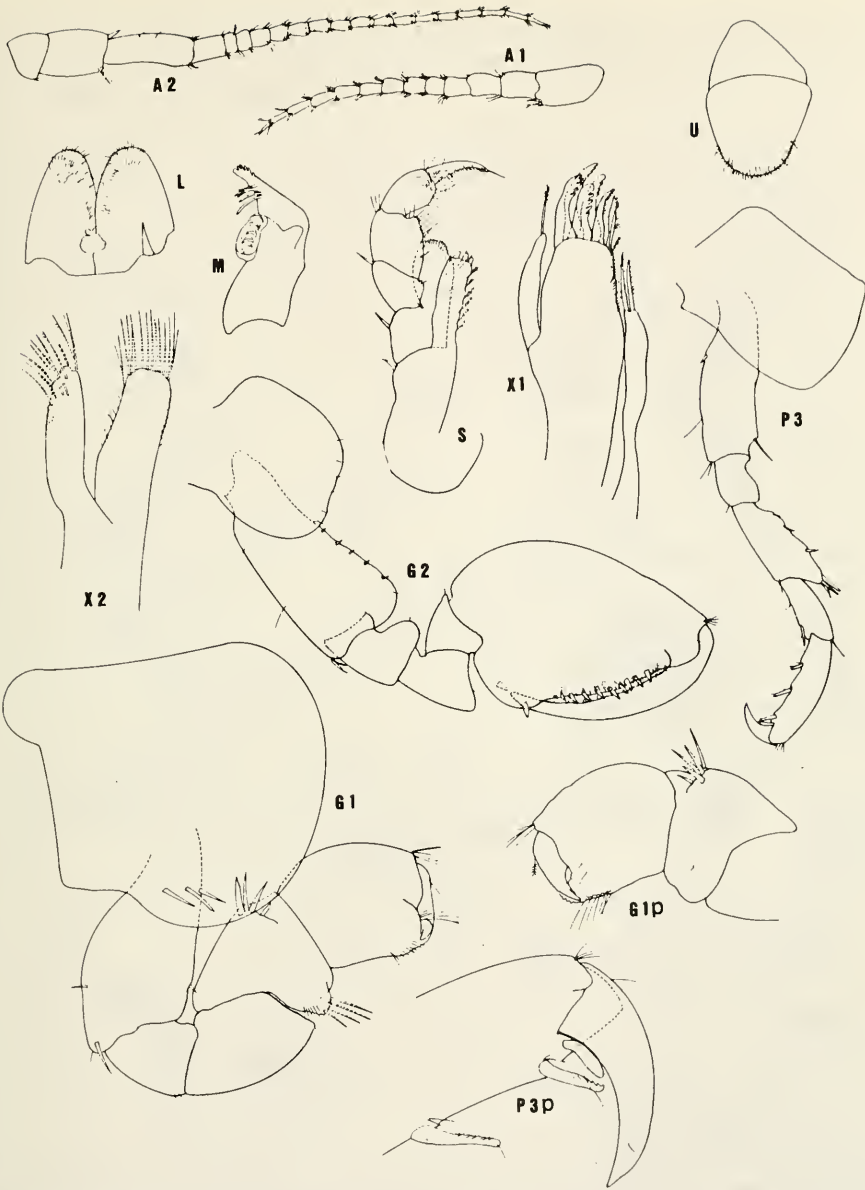


Fig. 6. *Hyale maroubrae*, male length 4.9 mm. Symbols as in Fig. 1. L, M, S, U, G1, and G1p, size scale equivalent to 120 microns. X1, X2, and P3p, size scale equivalent to 60 microns.

posterior margin, a fourth fusiform, distally just over the dactyl joint. Pereopods 4, strong spines on article 6 similar to pereopod 3. Pereopod 5, 6 and 7 with several spines on anterior and posterior margins of articles, article 6, spines similar to pereopods 3 and 4. Uropod 1, three dorsal spines on inner and outer margin of peduncle, a strong and short interramal spine present; outer ramus with two strong dorsal and four distal spines; inner ramus with three dorsal and four distal spines. Uropod 2, three dorsal spines on outer margin and one on inner margin of peduncle; outer ramus with three dorsal spines and three on distal end; inner ramus with two dorsal spines and four on distal end. Uropod

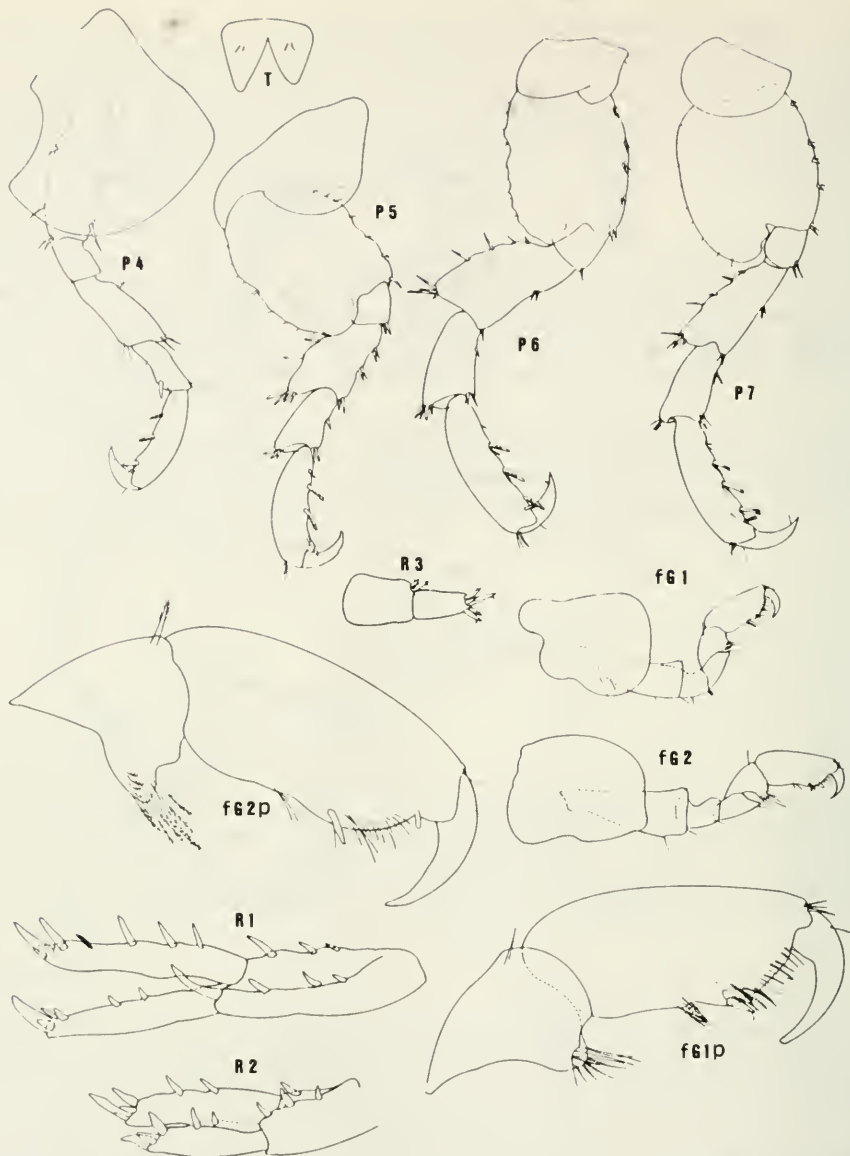


Fig. 7. *Hyale maroubrae*, male length 4.9 mm. Female "f" length 4.2 mm. Symbols as in Fig. 1. T, R1, R2, and R3. size scale equivalent to 120 microns. fG2p and fG1p. size scale equivalent to 60 microns.

3, peduncle with two distal spines and ramus with five to six distal spines. Telson completely cleft, two dorsal spines on lobes, without spines on lateral or apical margins.

#### Description of female "f"

Length 4.2 mm.

Gnathopod 1, semi-transverse palm, dactyl longer than palm, posterior margin of palm with two strong spines, posterior margin of article 6 with a bundle of plumose setae. Gnathopod 2, oblique palm, a strong spine on its posterior margin. Article 5, posterior lobes with plumose setae.

Examined material. Intertidal samples from: Bahía La Herradura of Guayacán (Coquimbo) 29°58'S 71°22'W; Montemar 32°58'S 71°30'W; Punta El Lacho 33°31'S 71°43'W; and Archipelago of Juan Fernández (Bahía Cumberland) 34°00'S 78°00'W.

*Hyale grandicornis* (Kröyer)

Figs 8–10

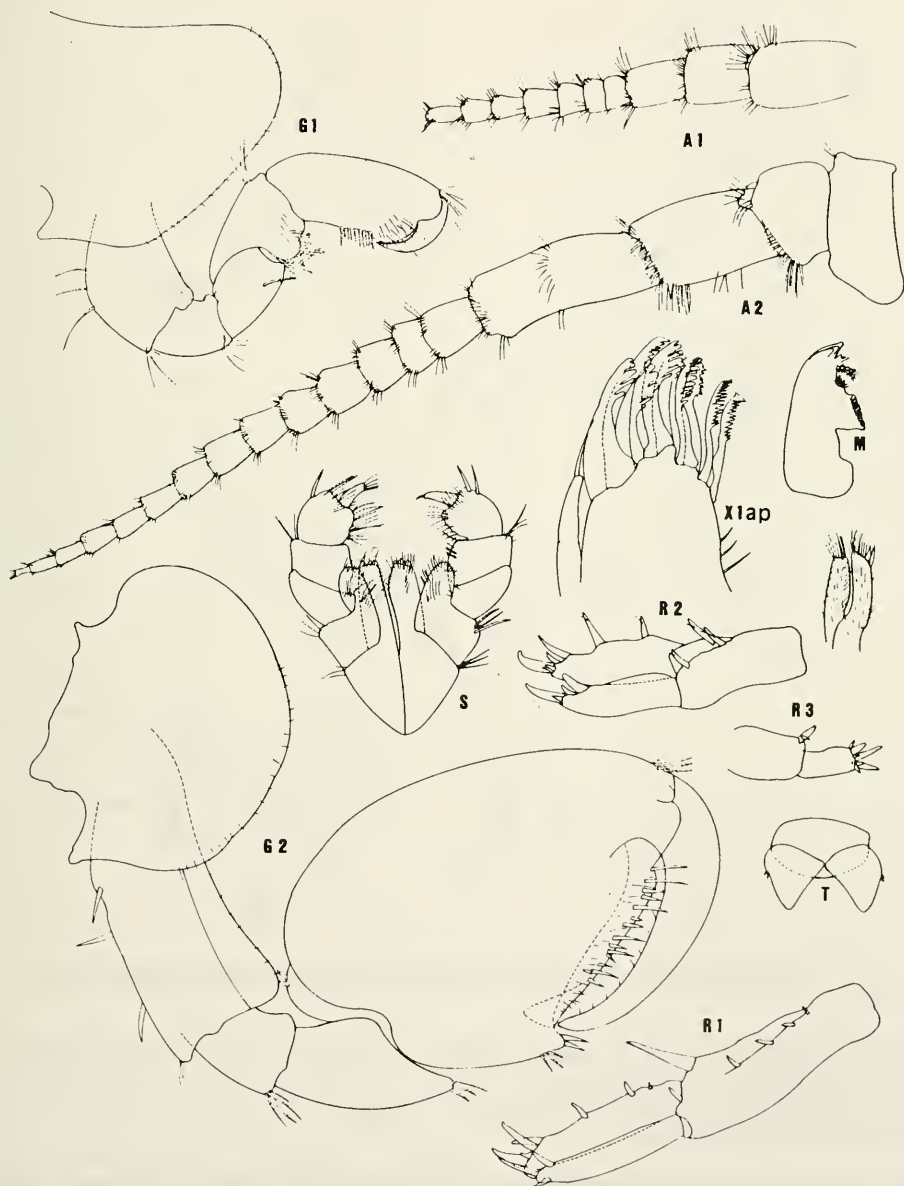


Fig. 8. *Hyale grandicornis*, male length 12 mm. Symbols as in fig. 1. X1ap. size scale equivalent to 60 microns.

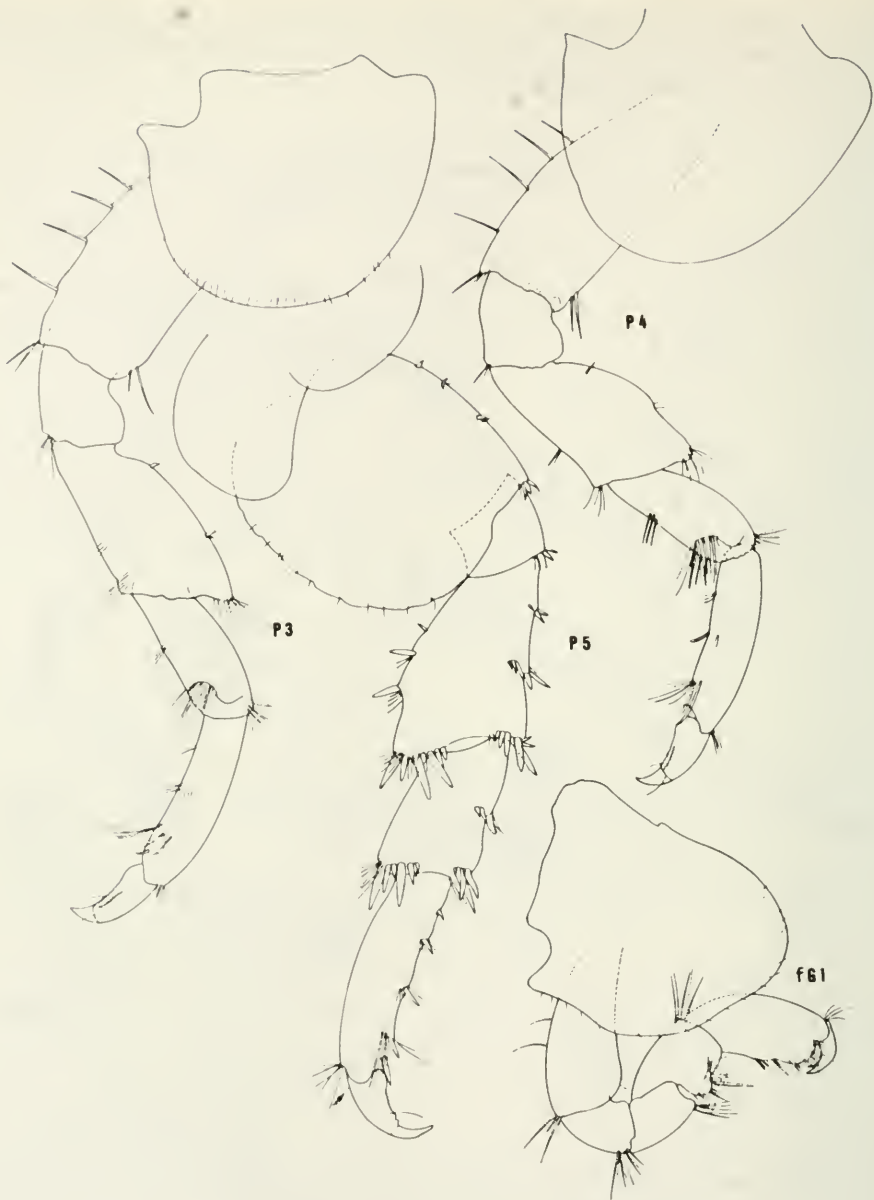


Fig. 9. *Hyale grandicornis*, male length 12 mm. Female "f" length 8.5 mm. Symbols as in Fig. 1.

*Orchestia grandicornis* Kröyer, 1845: 292. t. 1. Fig. 2 a-n.

*Hyale goetschi* Schellenberg, 1935: 227-229, Fig. 2.

*Hyale grandicornis* f. *thomsoni* Hurley, 1957: 904, 907, Pl. 2, Figs 24-29.

*Hyale grandicornis* Barnard, 1979: 114.

Diagnosis. Gnathopod 2 in male, subchelate and ovoidal article 6, oblique palm, strong spines on margin, postero-proximal angle with two strong teeth. Pereopod 4, articles 2 and 4 with setose poste-

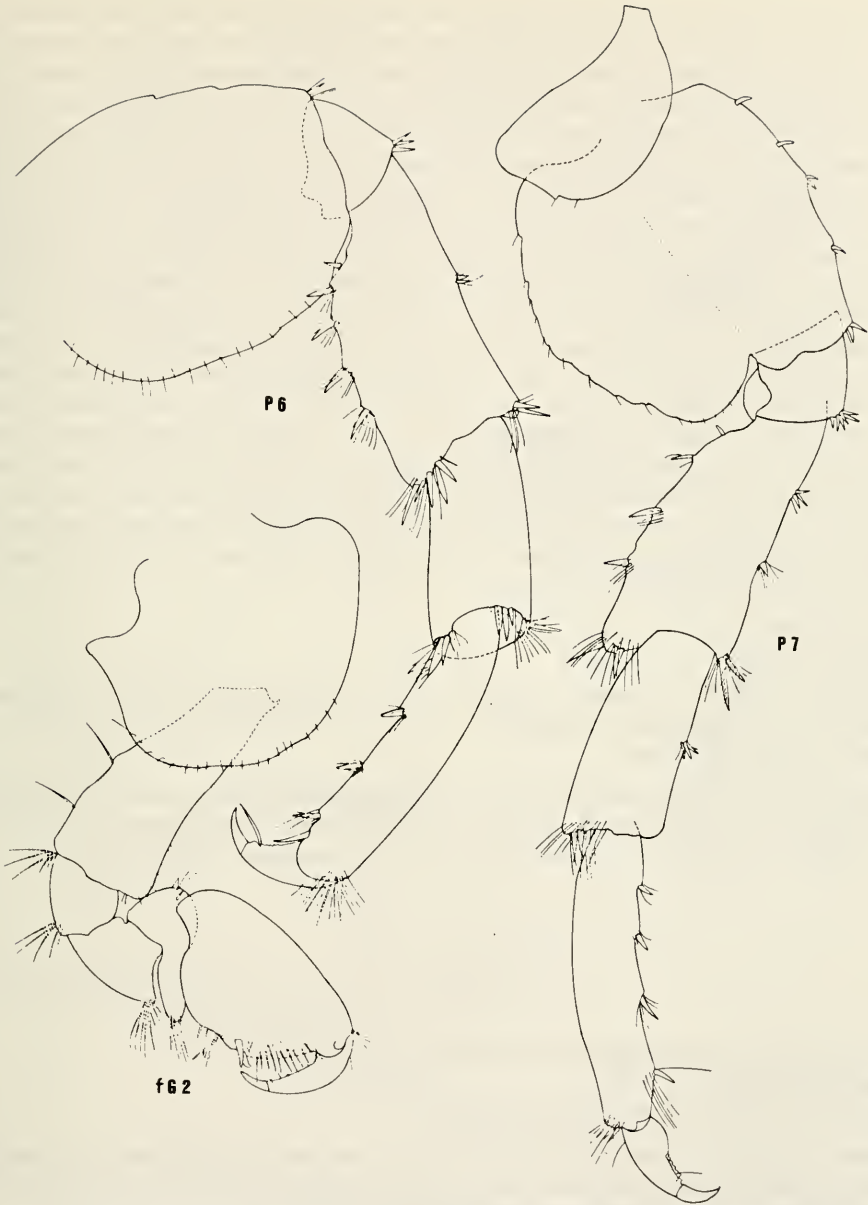


Fig. 10. *Hyale grandicornis*, male length 12 mm. Female "f" length 8.5 mm. Symbols as in Fig. 1.

rior bundles; without spines on outer ramus of uropods 1 and 2; pereopod 5, posterior lobe evident; lacinia mobilis, six teeth.

#### Description of male

Length 12 mm.

Antenna 1, much shorter than antenna 2, articles of primary flagellum setose on distal ends, longer than wider toward distal end of flagellum. Antenna 2 strong and long, articles of peduncle setose, teeth

on distal end of article 4; article 5 longer than the rest of articles, rows of spines on its medial region, primary flagellum with setae on distal ends of articles. Mandible like genus, with setae between lacinia mobilis and molar. Maxilla 1, palp with false articles; outer plate with strong, distally toothed spines. Maxilla 2, outer and inner plate with strong apical setae, setose on its faces. Maxilliped, inner and outer plate of similar size; subrectangular inner plates with three strong teeth and apical setae, inner marginal setae present; outer plate with rounded lobes, apical and marginal setae present; palp of articles wide, narrow dactyl, article 3 setose and with one to two strong spines. Gnathopod 1, posterior lobe of article 5 setose, plumose setae; article 6 subrectangular, bundles of infero-lateral setae on distal portion; transverse palm with a row of plumose setae on postero-distal margin, palm with setae. Gnathopod 2, article 6 subovate, oblique palm, occupying  $\frac{2}{3}$  of posterior margin of article, margin with strong spines and short setae; dactyl originating in a cavity at the end of palm, two strong spines on posterior end of palm. Pereopods 3 and 4, articles 5 and 6 setose, especially on its distal regions. Pereopods 5, 6 and 7, articles 4, 5 and 6 with strong spines, on article 6, restricted to anterior margins and distal end of article 5. Uropod 1, peduncle with four small dorsal spines, a big dorsal spine on distal end and a small interramal spine; outer ramus without dorsal spines, only three to four distal spines; inner ramus, three dorsal spines and four distal spines. Uropod 2, peduncle with three dorsal spines; outer ramus without dorsal spines, only four distal spines; inner ramus with two dorsal spines and four to five on distal end; characteristic of this species is the lack of dorsal spines on outer rami of uropods 1 and 2. Uropod 3, peduncle with one distal spine, rami with six to seven distal spines. Telson completely cleft, two small medio-lateral spines on its lobes.

#### Description of female "f"

Length 8.5 mm.

Gnathopod 1, article 5 with posterior lobe with setae between articles 4 and 6; article 6, subquadrate with setae on postero-proximal margin, oblique palm, occupies  $\frac{1}{3}$  of posterior margin of article, strong spines on posterior margin.

Examined material. Intertidal samples from: Bahía La Herradura of Guayacán (Coquimbo) 29°58'S 71°22'W; Montemar 32°58'S 71°30'W; Isla Negra 33°25'S 71°43'W; Punta El Lacho 33°31'S 71°43'W; Pelancura 33°32'S 71°43'W; Cobquecura 36°06'S 72°29'W; Antofagasta 23°38'S 70°25'W.

### *Hyale media* (Dana)

Figs 11–13

*Allorchestes media* Dana, 1853 & 1855: 898–899, Pl. 61, Fig. 4

*Hyale media* Stebbing, 1906: 569–570

*Hyale media* Hurley, 1957: 916–919, Pl. 5, Figs 79–90.

Diagnosis. Gnathopod 2 subchelate in males, oblique short palm, strong spines on its margin, pereopods 1 to 5 with strong serrated distal spine on article 6. Telson cleft with a upper spine on each lobe; rami of uropods 1 and 2 with two spines on dorsal margins.

#### Description of male

Length 9.0 mm.

Antenna 1, shorter than antenna 2, weakly setose. Antenna 2, article 3 of peduncle with strong spines on distal margin; article 4 with distal setae; article 5, setae on medial and distal region; primary flagellum with articles strongly setose. Mandible like genus, triturative molar. Maxilla 1, stout palp, it reaches further than the apical end of outer plate, the latest with strong toothed spines. Maxilla 2, apical setae on both plates, inner plate with one to two long plumose setae. Maxilliped, lobes similar to *H. grandicornis*, palp normal. Gnathopod 1, posterior lobe of article 5 with dense bundle of plumose

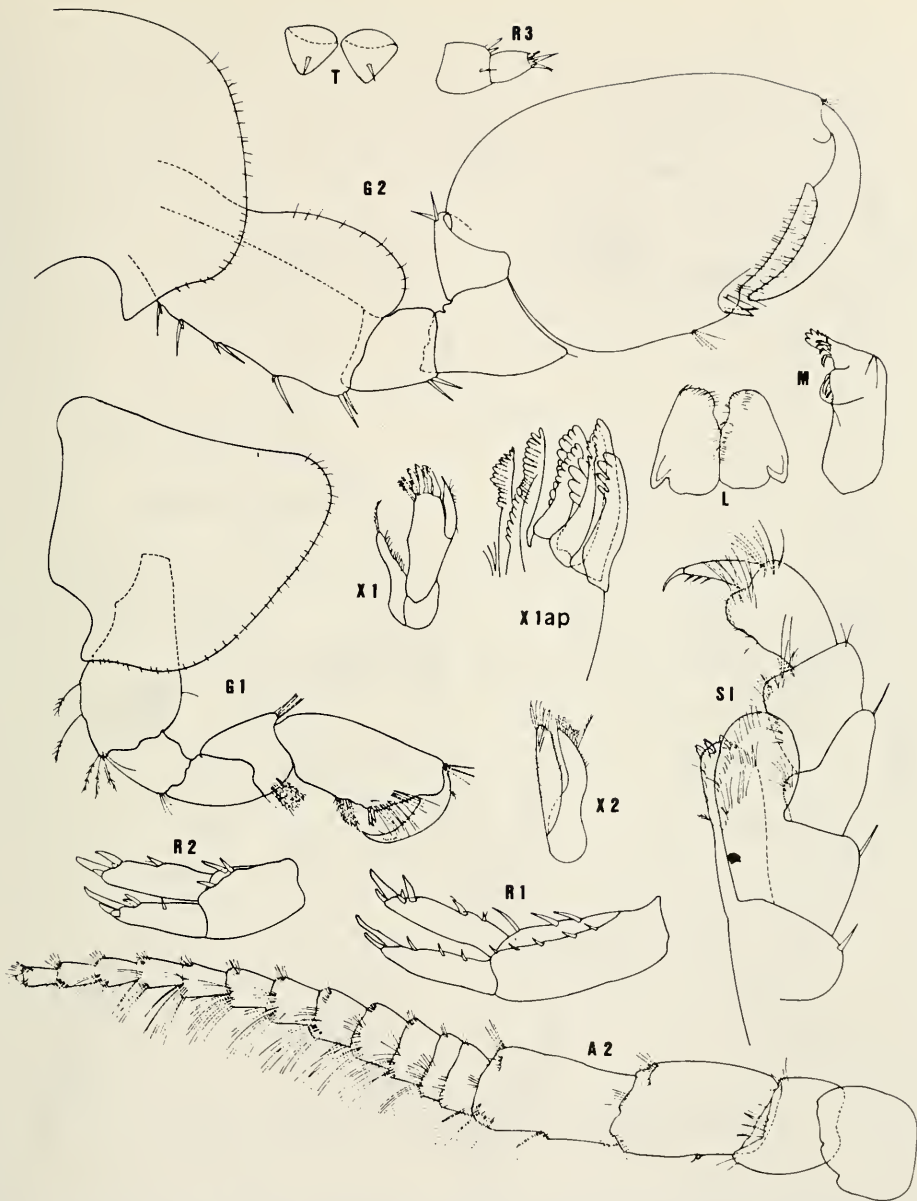


Fig. 11. *Hyale media*, male length 9.0 mm. Symbols as in Fig. 1. X1ap. size scale equivalent to 60 microns. S1. size scale equivalent to 120 microns.

setae; article 6, transverse to oblique palm, setae on medial to posterior margin, forming a bundle, palm with long setae, posterior margin with two strong teeth; dactyl longer than palm. Gnathopod 2, article 2 with distal anterior lobe, article 6, oblique palm slender, setae and three strong spines on postero proximal margin, occupies  $\frac{1}{3}$  of posterior margin of article, dactyl same length as palm, originating on the distal spines of palm. Pereopods 3 and 4 with one big toothed spine on posterior margin

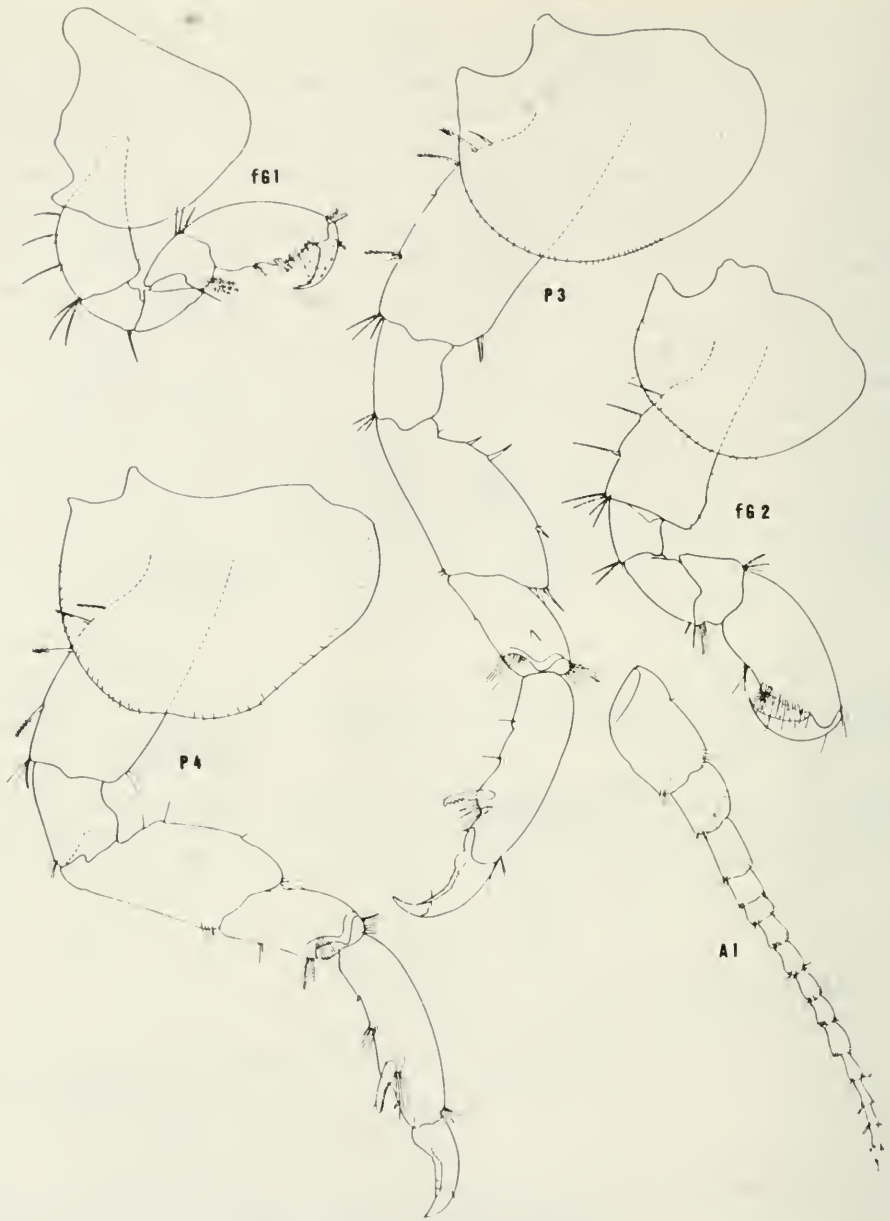


Fig. 12. *Hyale medea*, male length 9.0 mm. Female "f" length 7.1 mm. Symbols as in Fig. 1.

of article 6, it lacks spines on the rest of articles, only setae and weak spines. Pereopods 5, 6 and 7, with strong spines on articles 4, 5 and 6; article 6 with strong spines on anterior margin, the most distal is bigger, strong and toothed. Uropod 1, peduncle with seven to eight dorsal spines, three on outer margin and five on inner margin; outer ramus with one to two dorsal spines and five to six on distal end; inner ramus, three dorsal spines and two on distal end. Uropod 2, three spines on peduncle, rami with one dorsal spine and four to five distal spines. Uropod 3, two to three spines on peduncle, ramus with



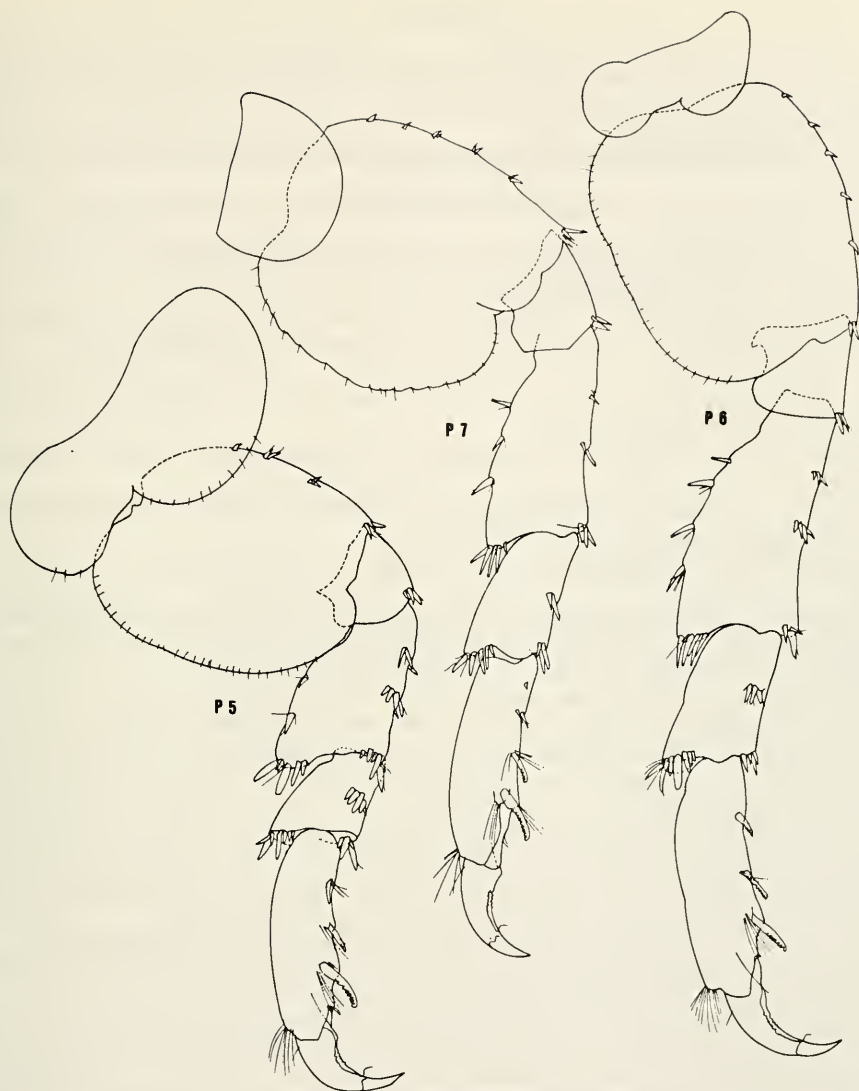


Fig. 13. *Hyale media*, male length 9.0 mm. Symbols as in Fig. 1.

four to five distal spines. Telson, completely cleft and with one strong medio-dorsal spine on each lobe.

#### Description of female "f"

Length 7.1 mm.

Gnathopod 1, article 5 with setae on posterior lobe; article 6, posterior margin with a bundle of setae, oblique palm with setae and two strong teeth on postero-proximal margin; dactyl longer than palm. Gnathopod 2 like gnathopod 1, article 5 between articles 4 and 6.

Examined material. Intertidal samples from: Bahía la Herradura of Guayaacán (Coquimbo) 29°58'S 71°22'W; Pelancura 33°32'S 71°43'W; Punta El Lacho 33°31'S 71°43'W.

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